ON THE SUMMIT OF MAUNA LOA

Dr. H. B. Guppy Camps There Alone For Three Weeks Making Extensive Scientific Investigations

NIGHTS WERE BITTERLY COLD

Interesting and Beautiful Cloud Effects.

Rarefied and Dry Atmosphere Produces Curious Results Upon the System.

[Special Correspondence.]

When at noon on August 8th I stood alone at the edge of the crater of Mokuaweoweo, my feelings were of a somewhat mixed character. I had just said good-bye to Mr. John Gaspar who had brought me up, and before me lay a period of solitude of three weeks or more. From a previous ascent made on April 1st I gathered that it would be very cold, but beyond this I knew nothing of the climatic conditons to which I would be exposed. However, I set to work at once to arrange the interior of my tent, got out my meteorological instruments and planned my course of examination of the crater.

Before many days had passed it became apparent that the conditions of my existence were not unlike some of those to be found in the moon. In the complete sterility of the surface, in the very existence of the grim old crater, at the edge of which I had pitched my tent, in the rarifaction of the atmosphere, in the intense dryness of the air, as indicated by observations on the relative humidity; in the prevailing cloudless sky by day and in the clear, star-lit calm and dewless nights; in the severe cold at night and in the scorching of the sun in the day, there were reproduced many of the conditions we would look for in that planet. Then, again, the air at first was highly electrified. My red blanket crackled under my hands at night and I could trace on its surface in phosphorescent hues with my finger-nail the letter A as I lay completely enveloped in its folds. The detached wings of dead butterflies picked up from the ground adhered provokingly to my fingers, and I began to imagine myself an electric battery. The effects of these meteorological conditions soon showed themselves in the cessation of the action of the skin, in severe headaches and sore-throat; in a tendency to palpitation and dyspnoea, and in sleeplessness, general lassitude and loss of appetite, most of which symptoms I attributed to the great lack of moisture in the air. I began seriously to think that Mr. Gaspar would find a mummy on his return, when a short spell of damp weather intervened, and most of the unpleasant symptoms having disappeared, I began to take more interest in my surroundings. And soon I found that I had a regular visitor twice a day in the shadow of the long mountain. For about 20 minutes after sunrise and before sunset the shadow of the mountain was thrown back against the sky of the opposite horizon. It seemed as if some Titanic brush had been at work on the sky far away, and had worked in the profile of the mountain with a very uncanny blue. Most evenings I used to light my pipe and watch the arrival and disappearance of the old mountain's shade. The peak was the last to go, and that was the signal for my retiring for the night. I was in the habit of getting up three or four times in the night to make observation of the wind and weather. At 1 a. m. on August 9th there was a most beautiful lunar halo, displaying most of the rainbow hues, the purple inside and the orange outside being most conspicuous. This was repeated in a less marked degree in the following night, and after that the phenomenon disappeared.

During my sojourn on the mountain top there was very little rain, only about 30-100 of an inch. This is in striking contrast to the rainfall above Napoopoo in August, where, as I learn from the Rev. Mr. Davis, more than 10 inches fell at an elevation as I infer of some 1,200 feet. Most of the rain on the summit fell during the night of August 12th and 13th, and in that night I had an uncomfortable time of it. The wind was very gusty and was apparently disposed to lift up my tent and carry it bodily into the crater. It was bitterly cold, and I lay down with my boots on, lit my pipe and prepared for the worst. The canvas was reeking with the wet, and every fresh gust of the biting northerly seemed to promise to deprive me of my shelter. Nature, however, came to my aid. After sunset it began to freeze hard, and before long the canvas of my tent was as stiff as a board and no longer swayed to and fro with each gust of wind. I then fell asleep for an hour or two, and woke up to find the wind blowing strong from the south. A rapid thaw had set in, and the canvas was again soaking with wet, the water running down on my stores. This was repeated during the night, and to vary the entertainment there were two earth-tremors, lasting in each case a few seconds. My tent, however, held bravely on. Sleep came to me in the early morning, and when I woke the sun was high up and there was a genial warmth in the tent.

My observations on the relative humidity have yet to be worked out with the requisite tables, but I may here remark that there was occasionally as much as a difference of 20 degrees between the wet and dry bulb thermometers, the usual difference being 10 to 15 degrees. At 2 p. m. on August 19th the reading of the wet bulb was 37 deg. and of the dry bulb 57.5 deg. The night as already remarked, were very cold. The lowest temperature recorded was 15 deg. Fah., and during the last week the minimum reading was always below 20 deg. The average minimum temperature for the period, August 9th to 31st, was 23.5 deg. The error of the thermometers at the freezing point was ascertained by placing them in melting pounded ice. Inside the tent the temperature was only about two degrees warmer and the water froze every night but one. I may add for the benefit of subsequent sojourners that the caves are much warmer at night. In a small cave near the tent, which was reached by two holes in the roof, the night temperature did not fall below 35 deg. The highest temperature of the air in the shade was 61.2 deg., the average maximum daily being 53.6, which places the average difference between the night and day temperature at 30 deg. This great daily range, which is about twice what it is at the Coast, was not the least trying of the conditions of existence in this elevated region. The mean of the maximum and minimum temperatures is 38.5 deg. Probably the mean temperature for the whole of August would be about 40 deg.

The cloud effects were often magnificent, but there is scarcely space to refer to them here. The snow-white sea of cumull that gathered in the forenoon around the mountain slopes usually concealed the Kohala mountains, but as a rule failed to hide the summit of Hualalai, and probably the level of its upper limit is on the average between 6000 and 7000 feet. Except on the few occasions when there were rain-clouds about, the summits of Haleakala and Mauna Kea were always visible. On the forms and movements of the clouds I made regular observations. Perhaps the most striking phenomenon was that of the evanescent cirrus. In one minute the observer may be gazing at a cloudless sky overhead. In the next there appears as if by magic a large white cloud, which being at no great elevation is carried rapidly across the zenith and dissolves away in the course of a few minutes. The history of one of those clouds may thus be traced. The spectator looking, we will say, to the east, sees only the clear blue of a cloudless sky. Then suddenly a tiny white speck appears and in a few minutes the speck becomes a conspicuous cloud. In less than half a minute it has attained considerable dimensions, and as it is borne rapidly westward it exhibits violent commotion in its interior, frequently changing its form and in a few minutes melting away altogether. Sometimes, when there were a number of these cirri visible, the heavens presented quite a bewildering spectacle in quick appearance and disappearance of the clouds and in their frequent change of form.

There was a continual struggle between the northerly and southerly winds on the summit, the vicinity of my tent in the middle of the west side of the crater being their frequent battle ground. At such times miniature whirlwinds carried up sand and paper into the air; and if the tent was open its interior became filled with dust. On the north and east sides the wind was usually north-east and easterly. On the south side it was south and easterly; whilst on the west side north to north-west and south-west to south-south-west were the prevailing directions of the wind; but the wind was rarely strong at the camp. One morning I left my tent at seven o'clock with a light southerly breeze blowing; but after proceeding about half a mile to the north I found myself facing a bitterly cold north-east gale, against which I could scarcely stand, so that my purpose of going around the crater had to be abandoned for that day. Returning to the tent, I met the northerly wind once more.

In order to familiarize myself with the principal features of the crater I adopted the method of making a rough plan of it with a pocket prismatic compass. The survey of this lonely region must have been a plucky bit of work. In some places the lava crust is thin and fragile, and although I never descended farther than my waist there is always in such localities a chance of a sudden descent into a cavern of considerable depth. I hope to be able to study the history of the crater by comparing its condition at the time of my visit with the accounts of its state given by previous observers. It is only by such a method of inquiry that one would be able to understand its various puzzling features. By a regular study of this volcano the forecasting of its eruptions would come within the domain of the possible. As we see it now, it displays to us the result of ages of eruptions, each great outbreak leaving some mark behind it often more or less obscured by the work of subsequent eruptions. Years of observation would be required to become really acquainted with the working of this vent; but this must be accomplished by monthly visits of two or three days duration. The establishment of an observatory would not be beneath the notice of an enlightened government. The sciences of vulcanology and of meteorology would be greatly benefited; and sun-flashing signals could usually be made to the summit of Haleakala and thence to other localities. I may remark that one Sunday morning Captain Simerson of the steamship Mauna Loa tried to flash up to me from Punaluu. However, I was not on that side of the mountain. To reach there I would have been obliged to leave my camp at an early hour with the thermometer far below the freezing point.

My descent into the crater was made on the north-west side. It was a tedious operation and one had to tread warily on the loose boulders that are often inclined to roll down and crush the intruder on his way. As soon as I reached near the centre of the great pit the clouds began to pour in on all sides over the lips of the crater. In a few minutes I was enveloped in a dense mist, and any further observation was rendered impracticable. During the prevailing dry clear weather with a cloudless sky "smoke" is only evident in two places in the crater, one near the centre and in the other in the south-west corner from the base of a yellowish cliff where there are apparently extensive deposits of sulphur. When, however, the sky is clouded, and especially when the air is moist, white vapour may be seen arising from the greater part of the surface of the crater. The change is a little startling, the true explanation being that a large amount of the vapour evolved is only visible in cloudy murky weather. It is, therefore, possible that the accounts of two observers may vary greatly as to the crater's condition, and yet no difference in the condition actually exist. This especially applies to the district on the south and south-west borders of the crater stretching about a mile to the southward. In cloudy weather white vapour arises from many places in this area. In the bright clear weather that prevails the visitor may see nothing and even walk unwittingly over numerous cracks and fissures whence the invisible vapour is being discharged. I took the temperature of several of these fissures. In those where the vapour was only seen in cloudy weather the temperature was about 104 deg. When the "smoke" is always visible the temperature is far higher, 160 deg. and over. Many of these cracks and fissures exhibit evidence of having originally giving passage to vapours at a very high temperature. The red glaze that coats their sides could never have been produced by the comparatively cool vapors now discharged from them. I should judge that the subterranean heat is now more actively displayed in the district extending a mile to the south of the big crater than in the crater itself. A very large amount of vapour is discharged from the borders of a small crater lying near Pohaku Hanalei, and this is probably the smoke sometimes observed from the Kona coast. One may expect that the next eruption will occur on this, the south-south-west slope of the mountain. I visited many of the miniature cones and small craters near the large crater. Reference may here be made to a landslip that took place on the north-east side of the crater during my stay. A tract about 200 yards long and 100 yards wide fell into the crater, producing a large amount of brown smoke. I visited the locality, and from my tour of the crater's circumference it became evident that these landslips are not infrequent and have been important factors in the enlargement of the crateral cavity.

Traces of numerous camps are to be found on the east side, at one of them I found the remains of a quarter of beef and a tongue still sweet, but much dried up. Near by half-full of rust-coloured water was a water-canteen cased in canvas with the letters D. H. H. painted on it. It has since proved to be the property of Mr. Howard Hitchcock of Hilo who was up there with Mr. Julian Monsarrat's party in April, 1896. Things keep well on this mountain top and I was uncertain whether three months or a year had elapsed since the party had feasted there.

Curiously enough, insects of various descriptions are common on the summit. One species of butterfly common at the coast is not at all infrequent. The butterflies were more often to be found dead than alive, and those flying about were in a half-drowsy condition and easily caught. There were flies of different kinds, the house-fly and the blue-bottle fly proving a great nuisance in my tent. Besides these there were moths, bees, gnats, and an occasional dead dragon-fly; whilst bugs and other insects were collected as they fed upon the bodies of the dead butterflies. These insects were more common when the wind was southerly, and no doubt they had been brought up to this absolutely sterile region by the wind. Evidently most if not all of the butterflies and moths soon die and probably the other insects too. The whole matter is however very suggestive and shows how readily insects (even the parasitical bug) may find their way into the upper air-currents.

During the last few days of my stay on the summit I found myself getting sensibly weaker which I attributed partly to want of sleep and partly to lack of appetite. The kerosene had got mixed with the biscuit on the way up and the sugar was in the same condition. Fancy also gave the same flavour to the bacon and rice and I swallowed my food like so much sawdust. My face was like that of a coal-heaver, washing being rather risky at that altitude. On the last day, however, I made myself a little respectable and awaited the arrival of the relieving party. When, therefore, on the evening of August 30th I heard the sound of voices and the clatter of horses' feet outside the tent, I was not long in giving the party a welcome. Mr. Gaspar had brought up with him two German naturalists, Dr. Kramer and Dr. Thilenius, the first well known on account of his previous work in the Pacific, whilst the second, who had only arrived at Honolulu a few days before, was on a scientific tour around the world and was collecting material for future embryological and general biological study. It was indeed an unexpected gathering of naturalists on that lonely mountain-summit. As we sat huddled together in the tent, drinking hot coffee and eating fat bacon to keep the cold out and talking of coral reefs and of the glorious life of the naturalist in those sunny climes, it was difficult to imagine that a few paces from us slumbered Mokuaweoweo and that we were in a land above the clouds. When we woke up at sunrise the thermometer stood at 20 deg. in the tent. The morning proved unusually warm and after Dr. Kramer had taken some photographs of the crater we commenced the descent. Mr. Gaspar conducted us safely to Napoopoo and thus pleasantly ended a rather trying expedition.

H. B. GUPPY, M.D.

Punaluu, Hawaii, Sept. 11, 1897.

RAINFALL FOR AUGUST, 1897.

From Reports to Weather Bureau.

Stations.	Elev. (Ft.)	Rain (In.)
HAWAII—		
Waiakea	50	9.42
Hilo (town)	100	10.22
Kaumana	1250	23.76
Ponahawai	1100	4.75
Pepeekeo	100	9.72
Honomu	300	11.63
Honomu	950	13 04
Hakalau	200	11 28
Honohina	.....	12.24
Laupahoehoe	10	.....
Laupahoehoe	900	.....
Ookala	400	9 42
Kukaiau	250	7.19
Paauilo	750	6 92
Paauhau	300	5 27
Paauhau	1200	5.75
Honokaa	425	5 90
Honokaa	1900	.....
Kukuihaele	700	7.15
Niulii	200	4.80
Kohala, (Ostrom)	350	5.50
Kohala Mission	585	5.35
Kohala Sugar Co.	234	.....
Waimea	2720	3.05
Awini Ranch	1100	10.10
Kailua	950	7.01
Lanihau	1540	6.75
Kealakekua	1580	10.36
Kalahiki	800	5.53
Kalahiki	1200	8.12
Naalehu	650	2.15
Naalehu	1250	2.71
Honuapo	15	0.73
Hilea	310	0.90
Pahala	0.68	1.81
Olaa (Mason)	1650	14.85
Pohakuloa	2600	16.27
Waiakaheula	750	7.65
Kapoho	110	.....
Poholki	10	3 98
Kamaili	650	8.53
Kalapana	8	.....
MAUI—		
Kahului	10	0.85
Kaanapali	15	1.37
Olowalu	15	.....
Hana Plantation	200	.....
Hana	1800	.....
Hamoa Plantation	60	4 04
Waiopai Ranch	.....	0.18
Paia	180	3.00
Puuomalei	1400	5.66
Haleakala Ranch	2000	4 33
Kula	4000	.....
Kaupo, (Mokulau Coffee Co.)	.....	.....
MOLOKAI—		
Mapulehu	70	2 07
LANAI—		
Koele	1600	.....
OAHU—		
Makiki Reservoir	150	.....
Punahou W. Bureau	50	.....
Kulaokahua	50	.....
King St. (Kewalo)	15	0.60
Kapiolani Park	10	0.26
Manoa	100	.....
Pauoa	50	.....
Insane Asylum	30	1.25
Nuuanu (School st.)	50	1 48
Nuuanu (Wyllie st.)	250	.....
Nuuanu (Elec. Stn)	405	4.10
Nuuanu (H'f-way H)	730	8 62
Nuuanu, Luakaha	850	12.62
Niu	6	.....
Maunawili	300	3.35
Waimanalo	25	.....
Kaneohe	100	1.95
Ahuimanu	350	9 57
Waimanalo		1.07
Kahuku	25	1.59
Waianae	15	.....
Waianae	1700	10.12
Ewa Plantation	60	0.22
Waipahu		0.40
KAUAI—		
Lihue, Grove Farm	200	1 30
Lihue (Molokoa)	300	1 97
Hanamaulu	200	1.05
Kilauea	325	4.01
Hanalei	10	5.25
Waiawa	32	.....
Makaweli	50	.....

Records Not Hitherto Published:

JULY—	
HAWAII—	
Kaumana	13 85
Niulii	1.48
Pahala	0.06
Kamaili	7.88
OAHU—	
Ewa Plantation	0.26
Nuuanu, Luakaha	12.62
Nuuanu, Half-way House	8.62
Nuuanu, Elec. L. Sta	9.00
JUNE—	
Pohakuloa, Hawaii	5.58
Ponahawai, Hawaii	4.75
Kula, Maui	0.87
Nuuanu, Elec. L. Sta	6.71

C. J. LYONS.

Kaukana Withdraws.

It is understood that the movers in the petition for E. C. Winston to run as an independent candidate for the House of Representatives, have withdrawn that petition.

News arrived on the Kinau yesterday that J. S. Kaukana, a candidate from the Second District, comprising Kohala, Kona and Kau, had withdrawn from the race. The Inspector of Elections of the district will be notified of the fact. The remaining candidates are G. P. Kamauoha, Achi, J. D. Paris and Jacob Coerper.

TIMELY TOPICS

ANNEXATION Is near at hand, we are told, and the arrival of Senator Morgan and Representatives Cannon, Landenslaeger, Berry and Towney seems to point in this direction. With annexation an unprecedented wave of prosperity is expected to sweep over the land, bringing with it dinners and feasts and merrymaking.

We have quietly been preparing for this event and laid in a stock of articles useful and ornamental for the festal board.

Our stock of **HAVILAND CHINA** is more complete than ever, and if any set or piece is broken by careless servants you can always have it replaced from our stock.

Sterling Silver Ware is indispensable to a well appointed dinner table. We have just received a new invoice of sets of Oyster Forks, Berry Spoons, Soup Ladles, Lettuce, Meat and Pickle Forks, etc., which are sold very cheap.

In **Plated Ware** we carry a full line of Spoons, Knives and Forks, Salvers, Tea and Coffee Sets, Coffee, Chocolate and Egg Spoons, Butter Dishes, Spoonholders, Casters, Water Pitchers, Fruit and Butter Knives, Fish and Pie Sets, Cheese Scoops, Sugar Shells, Crumb Trays and Brushes, and other articles too numerous to mention.

Also, Celluloid and Aluminum Comb and Brush Sets, Rookwood and Cut Glass ware.